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MONICA JANOWSKI

The wet and the dry
The development of rice growing in the Kelabit Highlands, Sarawak

The people of the area known nowadays as the Kelabit Highlands, at the headwaters of the Baram River in Sarawak, rely on many crops, and the forest is also an important source of food, both plant and animal, as well as of many materials for handicrafts (Janowski 2003). However, in their own minds, the Kelabit of the Highlands are primarily rice growers. The needs of rice as a cultivar govern and limit their involvement in other livelihood activities, since rice takes priority over everything else. Regular consumption of rice is the pivot around which their lives revolve: what are described as rice meals (*kuman nuba'*, 'eating rice') – so called even though they cannot take place without side dishes made from other foods – punctuate daily life and mark the high points of social and religious life.

I want to look in this article at what we know about the history of rice cultivation in the Kelabit Highlands, using information both from published sources and from informants, the latter gathered during a total of 26 months of fieldwork in the Highlands carried out between 1986 and 1988 and between 1992 and 1993. I want in particular to look at the relationship between wet and dry cultivation of rice as this relates to the special role of rice as a cultivar and as a food.

Settlement within the Kelabit Highland area

The Kelabit[1] homeland is an area now known as the Kelabit Highlands, at the headwaters of the river Baram adjacent to the border with East Kalimantan,

[1] Until after the Second World War the term 'Kelabit' was not an endonym; it appears to have originated in a mistake made by a government officer in Marudi. The people of the Kelabit Highlands described themselves according to the river or valley in which they lived Harrisson (1958). However, particularly since the 1960s, with increased contact with the outside world and success in the educational system, the term has come to be used by the people of the highlands themselves.

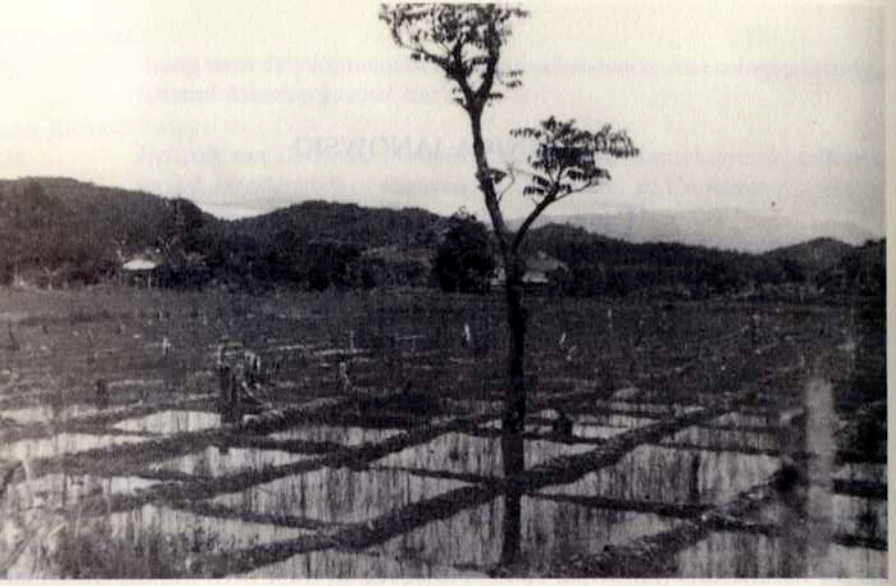

Figure 1. A rice field in Bario, Kelabit Highlands, in 1947, showing the way in which fields were subdivided into tiny sections with bunds of rotting grass guiding the water around the whole field, allowing slightly sloping land to be used

Figure 2. A rice field in Bario, Kelabit Highlands, in 1962. By this time the method of making rice fields had radically changed, with earth-moving having made possible big, terraced fields with big earth bunds

Indonesia. This forms part of a larger tableland area at about 1,200 metres above sea level, about 100 kilometres long and 70 kilometres wide, which has been described as the Kelabit-Kerayan Highland (Schneeberger 1979). It is inhabited by people who speak closely related languages, belonging to a group described by Hudson as the Apo Duat group (Hudson 1992), who also live, interspersed with other groups, over a wider area which includes Brunei and parts of Sabah. This tableland is partly in Kalimantan and partly in Malaysia, and it forms the headwaters of a number of rivers. There are probably at most 4,000 people living in the Kelabit part of the highland area nowadays.[2]

The Kelabit, like other Apo Duat peoples in the Kerayan Highland area (Sellato 1997), live in small communities (*bawang*) of about 100 people, made up of between one and three longhouses. *Bawang* are close to each other – within three or four hours' walk – and are both mobile and fluid in terms of membership. In the early part of this century, before the Second World War, they were generally more widely scattered and were located up smaller streams. Much of the settlement in the Kelabit Highlands is now concentrated in the area currently called Bario, where there are eight *bawang* within an hour's walk of each other. This concentration of settlement has come about since the 1960s. At the time of the Second World War, by contrast, there were at least eleven *bawang* scattered around the Kelabit Highlands, with only one of them in Bario. Outside of Bario there remain another seven outside Bario nowadays, but three of these are close to Bario, within two or three hours' walk. In addition there are four Kelabit *bawang* immediately outside the highland area in Sarawak. This concentration of settlement has been paralleled in the Kerayan area, with people concentrating in Kerayan Darat (Sellato 1997:38).

There are a number of reasons for the concentration of population in the Kelabit Highlands. One is that at the time of the Confrontation between Malaysia and Indonesia in the 1960s the government moved people from longhouses near the border to Bario. However, the fact that people remained in Bario once the Confrontation was over is due to two factors. One is the provision of services, including health clinics, schools and airstrips, and the siting of a government-run airstrip in Bario from 1962. It would seem that the concentration of population which has also taken place in the Kerayan highland

[2] There were estimated to be 5,059 Kelabit in 1987 and a growth rate of 4% from 1970 to 1980 (Ko 1987). If this growth rate is applied to population growth after 1987, this would imply a total of around 8,500 in 2001. The distribution of this population between the Highlands and town is difficult to assess. Most Kelabit outside the Highlands live in the town of Miri at the mouth of the Baram. Martin (1994) estimates only about 1,000 in Miri in the mid-1990s, but it seems likely to me that this may be an underestimate. Lian and Bulan state that, in 1989, less than 50% of the population lived in the longhouse settlements (Lian R. Saging and Bulan 1989:92), in other words in the Highlands and the Kelabit settlements immediately surrounding the Highlands, and I had the same impression around the same time. If anything, a smaller proportion probably now lives in the Highlands than in the late 1980s.

area (Sellato 1997:38) is also due at least partly to the provision of government services in certain places, as in the Kelabit Highlands. The other factor operating in the Kelabit Highlands, and possibly also in the Kerayan, is the desire to make wet rice fields. This has to be understood in the context of the striking growth of permanent wet rice cultivation since the 1960s.

Rice cultivation in the Kelabit Highlands in the early twentieth century

We have some information from visitors to the Kelabit Highlands on the methods of rice cultivation practised there in the early part of the twentieth century: from R.S. Douglas, the Resident of the Baram District in the very early part of the century (Douglas 1909); E. Banks, the curator of the Sarawak Museum in the 1930s (Banks 1937); W.F. Schneeberger, a geologist who carried out a survey for the Royal Dutch/Shell Oil Company in 1939 (Schneeberger 1979); and Tom Harrisson, who was parachuted into the Kelabit Highlands by the British in the Second World War to organize resistance against the Japanese and who later became curator of the Sarawak Museum (Harrisson 1949, 1958, 1960a, 1960b, 1962). More recently, Yahya Talla, himself a Kelabit, gathered detailed information from other Kelabit in Bario about agricultural practices in the past (Talla 1979:301-70).

Rice was, in the early twentieth century, cultivated in both wet fields (*late baa*) and dry fields (*late luun*). Banks suggests that in the 1930s wet rice was only cultivated in what was then called Lam Baa, literally 'in the wet rice field' (Banks 1937:426). Talla says that only the areas below the Tamabu and Murud ranges were ever used for wet rice agriculture (Talla 1979:301), and that other Kelabit were swiddeners; but it is not clear how far from the slopes is 'below', since the Kelabit plateau is a long narrow area between the Tamabu and Apad Duat mountain ranges running north-south. In fact it would seem that many *bawang* outside Lam Baa did practise wet rice agriculture, even if they also practised dry cultivation. Douglas says, following his visit in 1908, that the Kelabit '[farm] to a large extent by irrigation [so that] nearly the whole of the jungle has been cleared away' (Douglas 1909:53), although it is not clear how extensive an area he actually saw. Harrisson states that there used to be much more wet rice cultivation in the past in areas now abandoned (Harrisson 1949:191), including at Ra Mudoh (Remudu) at the southern end of the Highlands (Harrisson 1962). Informants in Pa' Dalih and Batu Patong say that at the southern end of the highlands, 20 miles away from Bario at Batu Patong, wet rice was cultivated recently, probably around the beginning of the twentieth century. This is halfway across the valley, much further east than Remudu, and cannot be said to be 'below' the Tamabu or Murud ranges. While at Lam Baa wet rice fields were made in the fairly extensive sloping areas which exist there, in some other parts of the highlands, for example in Batu Patong, they were made in the past (as they are now) in smaller floodable areas, including ox-bow lakes.

Talla and Harrisson both give information about the wet rice cultivation methods in use before 1958 in Lam Baa. Here, the people had no choice but to make wet fields since there was very little good, non-peaty land which was not flooded regularly. The agricultural cycle was governed by the arrival of migratory birds; birds are important as messengers from the spirits/deities throughout Borneo (Harrisson 1960a). The system used was designed to make best use of the small amount of water available so close to the headwaters of the river. Harrisson emphasizes that wet cultivation of rice in Lam Baa was not permanent cultivation but a form of shifting cultivation (Harrisson 1960b:44). I myself was told by informants that land in Lam Baa was used for about 8-10 years and was then left to rest. However, Harrisson says that the irrigation ditches which fed the system are old, and their existence implies that areas were re-used regularly (Harrisson 1960b:44). No terracing was done, and no earth moving carried out; instead, gentle slopes were used (and in fact preferred to entirely flat areas), and were irrigated by making bunds of rotting vegetation to divide the field up into tiny sections, with water being sent around the area in a complex route to cover all the sections (Talla 1979:213-329; Harrisson 1960b:44-5). Harrisson provides a diagram of a wet rice field of this type in 1959, which is just before more permanent wet rice cultivation methods were introduced (Harrisson 1960b:45). Talla says that transplanting was practised in the old-style wet rice cultivation in Lam Baa (Talla 1979:314), although it would seem that transplanting may not always have been part of the system, since it was only introduced around 1956 in the Kerayan area (Padoch 1981:35).

The methods practised in Lam Baa were not, however, the only ones used in the Kelabit-Kerayan highland area at the time. In some parts of the Kerayan area, rice agriculture at this time was more permanent than at Lam Baa, employing some terracing and more complex irrigation systems with better water control and bigger sections. Schneeberger, who visited in 1939, describes the wet rice cultivation in the Kerayan as *sawah*, which is the term usually used for permanent wet rice fields in Malay/Indonesian. Here, it would seem that there were quite well-established fields whose making may well have involved some moving of earth and which may therefore have been permanent or semi-permanent (Schneeberger 1979:51). Indeed the Kelabit still consider that the people of the Kerayan are more skilled wet rice agriculturalists than they are themselves, and in Bario they employ them in the wet fields partly for this reason.

While in Bario, as Talla says (Talla 1979:310-1), there is no choice but to practise wet rice agriculture because the soil is either flooded and/or peaty and cannot be used for dry rice cultivation, in much of the Kelabit Highlands dry cultivation was the main method of cultivating rice. It is also probable that, as is the practice now in longhouses outside Bario, people may well, in some areas, have

Figure 3. Morgan Balang Pelaba of Pa' Dalih by one of the relatively new wet fields in Pa' Dalih in 1987. The baskets are of a new variety, said to have been brought in from the Kerayan, with a flat bottom; these are appropriate for use at the side of a wet rice field, which is usually relatively flat. The older style Kelabit baskets, described by them as 'pointed', have rounded bottoms; these are more appropriate for a sloping.

made both wet and dry fields, or only dry fields. There are advantages to both types of cultivation, which I will discuss later. Dry cultivation in the Kelabit Highlands was, like wet cultivation, governed by the arrival of migratory birds before 1947 (Talla 1979:363-70). The sequence followed was similar to dry swidden cultivation elsewhere in Borneo. Talla says that the Kelabit preferred to fell virgin forest (Talla 1979:362), but this is not what I was told by informants in Pa' Dalih, who said that they preferred secondary forest, particularly in the past when they had fewer tools.

Livestock

The Kelabit keep pigs and buffaloes nowadays. Today, buffaloes are kept for slaughter at naming feasts, *irau pekaa ngadan*, as well as being used in the wet rice fields to trample the soil (see below). Originally, it seems that deer domesticated from the forest were kept for slaughter at feasts, since the Kelabit had no buffaloes. Buffaloes gradually replaced deer after the peace conference held in

Remudu in the southern part of the highlands in 1911 (Talla 1979:383; Douglas 1912). Nowadays, deer are not normally kept, although the headmaster in Pa' Dalih was keeping a few in 1986-1988 when I lived there; he explained this as being a commemoration of the old practices.

Pigs are also kept for slaughter at naming feasts. In the past they were also kept for slaughter at life-cycle rituals. Neither pigs nor buffaloes appear ever to have been slaughtered for daily consumption. Nowadays and in the past, wild meat was eaten on an everyday basis.

Present-day rice cultivation in the Kelabit Highlands

The opening up of the Kelabit Highlands to the outside world by the introduction of a regular air service to Bario in 1962 affected rice agriculture in the Highlands profoundly. Before that time, rice was produced almost entirely for subsistence. Most was for consumption within the household – which I term 'hearth-group' due to the central role of the hearth and the rice meal cooked at it in constituting the kin group at the core of the household (Janowski 1995). A good deal was also consumed within the broader Kelabit community in contexts when the hearth-group provided rice for others, the most important of which was feasts (*irau*). Much of the rice consumed was drunk as rice beer (*borak*) which was important in generating social cohesion as well as status (Janowski forthcoming).

With the regular air link to the coast which was set up in 1962 from Bario, it became possible to sell rice by air to town. Certain varieties of rice which are grown in the highland area, known as *pade adan* and *pade dari*, are very much liked in town, and are highly saleable there, where they are known as 'Bario rice'. Kelabit informants told me that rice grown in the highlands tastes better than that grown in the lowlands; I was told, for example, that *pade adan* grown in Long Peluan, a Kelabit community outside the highlands, is not as tasty as *pade adan* grown in Bario. Perhaps the difference in taste is related to the longer growing season in the highlands. Part of the reason for the popularity on the coast of 'Bario rice' probably derives, therefore, from the fact that it has been grown in the highlands. However the *pade adan* and *pade dari* varieties themselves are also liked; they have small grains, are very white and are considered to have a good texture. Because of the market for 'Bario rice' and the fact that Bario is an area which is very suitable for growing these varieties (they can only be grown in wet fields) the communities which were within the Bario area and could carry their rice to the airstrip found themselves presented with an opportunity to export rice to the coast. Just at this time, the Confrontation with Indonesia led to the government settling people from communities along the border in Bario. The explosion in production of rice for export began. People

from other communities, which had not been moved to Bario, began of their own accord to move there, and to grow wet varieties of rice for export.

The amount of rice exported from Bario each year in the late 1980s and 1990s may well have been over 2,000 tonnes a year, and this can only have increased since then. This is calculated on the basis of approximately 10,000 ha being under cultivation; in 1982, when the Sarawak Department of Agriculture commissioned a Soil Survey in the Kelabit Highlands, 9,091 ha was under cultivation as wet rice fields in Bario (Eilers and Loi 1982:35), and this probably increased by at least 10%, possibly more, in the 10-15 years after that. If one assumes that 500 kilos of husked rice is produced from each ha then the total production of the Bario area at that time would be around 4,500 tonnes. It is probable that at least half of the total production, in other words at least 2,000 tonnes, was exported each year, and if one assumes that around 10 tonnes can be carried by each of the small planes which flew into Bario, then 200 flights would be required to take this amount of rice out to the coast each year. In the late 1980s and early 1990s there was one daily flight to Marudi and a flight to Miri three times a week, meaning a total of about 500 scheduled flights per year. This number was reduced due to the fact that flights were often cancelled due to wet weather or cloud; the airstrip was grass at that time (it is now tarmac). There was a lot of pressure on flights, since not only rice but people and goods all had to come in and go out by air. While it may therefore seem unlikely that 200 flights could be devoted to carrying rice out of Bario, it should be pointed out that, in the late 1980s and early 1990s, at least half of the rice which was exported went out on separate flights chartered by Kelabit business people based in Bario.

Due to the increasing ease of importing tools (see Talla 1979:330), the assistance from the government under the Assistance to Padi Planters Scheme which gave financial assistance allowing the peaty swamps to be drained (after which buffaloes could be used to trample the fields, an innovation introduced from the Kerayan at this time) (Talla 1979:332-3, 345) and the fact that more money was in circulation due to the sale of rice after 1962 – particularly after 1972 when there was a reduction in air freight costs for transporting rice – it became possible to move earth, make big bunds and create permanent wet fields. Talla gives a description of the process by which this occurred (Talla 1979:329-44). The major innovation has been the creation of flat terraced fields rather than sloping ones. It is still the case that only gently sloping land is used, however; land which has any significant slope to it is still not cultivated. In the Kerayan area across the border, on the other hand, steeper slopes are terraced.

Those who were already settled at Bario in the settlement of Lam Baa were in an advantageous position in terms of taking advantage of the potential for growing and exporting rice from wet fields. People who came to Bario from other parts of the Highlands at the time of Confrontation and later were accommodated and given land by the people of Lam Baa. However, as more

and more people moved to Bario in the 1960s-1980s, it became more difficult to obtain land. People began to open areas of deeper peat, which necessitated the removal of very thick layers. The fact that such fields are seen, by Kelabit custom (no Kelabit actually has legal title to their land in the Highlands) as the possession of their creator, due to the investment of labour, increased the desire to make wet fields. The increasing demand for land made it advisable to hang on to what land one had. This is true even if one is no longer living in Bario. Much of the wet rice land in Bario and the communities immediately around it is not, at the beginning of the new century, being cultivated by those who 'own' the fields, because many Kelabit, particularly from Bario, have been successful in education and have gone to live in Miri and other towns. They rent out their wet rice fields on a 50% sharecropping basis to people from across the border with Indonesia, who belong to the closely related ethnic group usually called the Lun Dayeh (Bala 2002).

In Pa' Dalih in the southern part of the Highlands, where I carried out fieldwork, dry fields were, according to all informants, the main type of field made until the 1960s. Even in settlements like Pa' Dalih outside Bario which are not able to transport rice to be exported by air in any significant quantities (the only way of getting to Bario from the southern settlements is on foot, a journey which takes around twelve hours with a heavy load) there is a strong impetus to make permanent wet rice fields nowadays. Since the 1960s, more fields have been created every year. Dry fields are still extremely important, but they have, I was told, become much smaller than they were. There is now a reliance on both wet and dry cultivation for producing rice in Pa' Dalih. Wet fields are made either in small flat peaty areas, where the peat has to be removed, or in watercourses, which are extended or deepened for the purpose – for example in an oxbow lake near the longhouses in Pa' Dalih. The people of the settlements in the southern part of the highlands hope that they may be able to export rice eventually; and they are extending the short mission airstrip in the hope of being able to receive charter planes. However, in the 1980s and 1990s they simply produced more rice in wet fields than they did before. In 1997 a logging road reached a spot near the community of Remudu three hours' walk from Pa' Dalih; I do not have information as to whether any rice is being exported on logging trucks, although it seems unlikely that much could be exported this way.

A total of around 35 varieties are cultivated at any one time in Pa' Dalih. Between 1988 and 1992, when I returned to Pa' Dalih for a second period of fieldwork, about 30% of the varieties had changed (people constantly experiment with new varieties brought in from other communities and even from other parts of Sarawak), but there was still a total of about 35 varieties being planted. Most of the rice varieties cultivated in Pa' Dalih in 1986-1988 could be cultivated in both wet and dry fields. The only varieties which could not, I was

told, be grown in both kinds of field were the *pade adan* and *pade dari* varieties – precisely the varieties which are liked in town and which are exported by air from Bario. Thus, it is only through making wet rice fields that it is possible to participate in the export of rice.

Other starch crops

As well as rice, the Kelabit of Pa' Dalih grow a number of other grains: maize, millet, Job's tears, black sorghum and a grain called *bua' lengoh* which I could not identify. They also grow root crops: cassava, potatoes, sweet potatoes and taro. However only rice is eaten at the central eating event, repeated three times a day, *kuman nuba'*, the rice meal. Other starchy crops are eaten as snack foods; maize and cassava are particularly significant in terms of the amount eaten. While snacks are important in terms of nutrition, they are not overtly emphasized in terms of constructing social cohesion or in terms of generating status, as is rice.

Some of the starch crops other than rice may in the past have had a role equivalent to the current role of rice. Some of the grain crops other than rice which were grown in Pa' Dalih during my fieldwork may well be very ancient crops in Borneo; they are also grown by members of other tribal groups who are, like the Kelabit, predominantly rice growers (Cramb 1985). Apart from maize, which was certainly introduced in post-Columbian times and is now cultivated in considerable quantities for consumption as a snack food in various forms, very small quantities of the other grains are now grown. When they are eaten, it is as a snack food. In the past, until the Kelabit converted to Christianity between the 1950s and the 1970s – when they gave up making beer – their purpose was for brewing beer. However, most beer appears to have been made from rice, and it is an important expression of the centrality of rice (Janowski forthcoming). The use of other grains could suggest a more central role, practically and/or symbolically, for them in the past. In some other parts of Southeast Asia, millet takes a central symbolic and ritual role equivalent to that of rice in most parts of the area, and there are grounds for supposing it to be a very old Austronesian cultivar (Blust 1976; Fox 1997).

However, in the Kelabit Highlands, taro is perhaps the most likely contender for the role of central starch crop in the past. As I will discuss below, it is quite likely that wet cultivation of naturally swampy areas is ancient in the Kelabit-Kerayan highland area. Taro is of course grown in wet fields, and is the only starchy crop grown by the Kelabit which is suitable for such sites. It has been suggested that swampy fields now used for rice may have previously been used predominantly for taro cultivation by Kenyah groups in other nearby parts of interior Borneo (Sellato 1997:32), and it is possible that this

may have been the case in the Kelabit-Kerayan highlands too. Some authors contend that pond-field irrigation may have first been developed in Southeast Asia in conjunction with taro cultivation and that wet rice may have appeared later as a pond-field weed (Hedin and Haudricourt 1943; Oka and Chang 1959; Haudricourt 1962; Barrau 1965). There are two crops carried by Austronesian peoples to Polynesia which have there, and presumably are likely to have had in insular Southeast Asia at an earlier time, a central symbolic and ritual role: taro and yam. Of these, only taro is cultivated by the Kelabit. The central ritual role of taro in Polynesia could suggest that in Southeast Asia it may have had a central role in pre-rice agriculture for the ancestors of the present-day peoples of both Southeast Asia and Polynesia. Nowadays, it does not retain any special position in the Kelabit Highlands, where its only role is as pig food. However, in nearby Kenyah areas it is mixed with rice to make the staple starch dish served at meals (Sellato 1997:32).

The method of cooking rice in both the Kelabit-Kerayan highland and in the Kenyah area (with a large quantity of water for two/three hours, beating towards the end to destroy the shape of the separate grains, producing a uniform sticky mass which solidifies on cooling into a solid mass) produces something which is similar to cooked roots, which lends support to the idea that taro used to be the staple, as does the fact that the Kelabit/Apo Duat names for taro (*opa'*) and for cooked rice – (*uba'* or *nuba'*) appear possibly cognate (Sellato 1997). The word *nuba'* itself seems to refer to the form in which the rice is presented as cooked food – a mass of mashed material which adheres together – rather than to the fact that it is rice. *Nuba' dele* ('maize *nuba'*) – mashed cooked maize, packed in leaves as is rice *nuba'* – was occasionally made while I was in Pa' Dalih, and informants told me that they occasionally make something they call *nuba' ubi*, 'root *nuba*'', which consists of mashed cassava, mashed yam and glutinous rice (although I myself never saw yams in cultivation or being eaten). There is a Kelabit myth that in the past rice grains were huge and did not have a husk, so that they did not require any processing. This could be read as a myth about of the introduction of work (being hard-working in the rice fields, *rajin*, is something on which the Kelabit place a good deal of emphasis and which generates status); and/or it could relate to the fact that in the past a root crop, probably taro, was cultivated as the main starch food; the huge rice grains may have been taro tubers.

The advent of rice to the Kelabit-Kerayan highland area

The introduction of rice to the interior of Borneo, and specifically to the Kelabit-Kerayan highland area, is not recorded in any written form, and we can only guess at when and how it was introduced. The first, and relatively

uncontestable, point to make is that although rice is present linguistically in Proto-Austronesian in Taiwan in 3000 BC and must have travelled into equatorial regions of Southeast Asia with Austronesian settlers, it cannot have been a major crop in equatorial regions such as in Borneo until varieties of rice were developed which were suitable for these latitudes, in particular in terms of losing photo-period sensitivity (Bellwood 1985:232-3). Thus, Austronesian settlers may have brought rice with them to Southeast Asia but it must have been some time before they were able to do enough selection work on it for it to become a crop upon which they relied for a major part of their food supply. How long that may have taken is very difficult to guess.

What is clear is that in much of Southeast Asia, rice has now become the most important crop. In some areas this is true only in symbolic and ritual terms, in that only small quantities are produced and this rice is used only in ritual contexts and/or is eaten only by those of high status. In other areas, including the Kelabit-Kerayan highland area, it is not only culturally and symbolically important but it is also the most important crop in terms of amount produced, and is eaten at every meal (although not as the only snack food outside meals) by everyone.

Rice has become so central to the Kelabit that decisions relating to its cultivation cannot be assessed and understood in the same way as those relating to the cultivation of other crops. Rather than being production simply for consumption, rice cultivation can be said to be what Brookfield (Brookfield 1972) has termed 'social production', in other words it cannot be explained in Boserupian terms of any tendency to behave in accordance with the principle of least effort (Boserup 1965). The Kelabit themselves say that if they were willing to subsist on cassava they could do so with much less effort, but, as they say, 'Da'at kinan (ubi kayu). Pengah male lemulun kuman pade'.' ('We don't like to eat (cassava). People are used to eating rice.') In other words, all rice production involves the investment of more effort than is necessary, and this is a choice that is made on the basis of the perceived absolute necessity of eating rice three times a day and of having enough rice for communal feasts at certain points in the year. For a married couple leading a hearth-group, not to achieve this means not being able to maintain their own separate hearth-group any longer, and having to attach themselves as dependants to another hearth-group that is able to provide enough rice for them too – thus increasing the status of the leaders of the other hearth-group (Janowski 1995).

Kelabit myth does not tell of the introduction of rice, but implies that rice has always been cultivated in the area. The fact that there are no stories of its introduction could indicate considerable antiquity for its cultivation. On the other hand, paradoxically, because of the very centrality of rice growing it is possible that there has been a rapid loss of collective memory regarding its introduction, and that rice was in fact introduced much more recently. Because being a rice grower is associated with status and arguably even with being fully human (Janowski 2003), the Kelabit would like to believe that they have 'always' grown it and even if it was actually introduced only a few generations ago, they have chosen to discard the memory of this. Instead, they mythologize the introduction of rice and situate this at the beginning of cultural time.

Wet and dry cultivation

It has been suggested that when rice was first introduced to equatorial Southeast Asia it was cultivated in naturally wet areas, using a method which has been described as *rawa* (Schneeberger 1979:48; Okushima 1999), differentiated from *sawah* cultivation by the much lower level of control of water. It has also been suggested that some varieties were developed early on which were suitable for dry cultivation (Bellwood 1985:239-40), and varieties which were taken into equatorial regions could well have included varieties adapted to both swampy and dry conditions. However, not only are naturally wet areas the environment in which rice occurs naturally, and grows most easily, but clearing forest to plant rice requires a good deal of work, particularly without access to many iron tools (Padoch 1981; Dove 1989; Okushima 1999). We do not know how quickly Austronesian settlers penetrated to the interior of the island of Borneo, but when they did they may have taken swamp-adapted varieties of rice with them. We do know from recent archaeological finds that some rice was being grown at least 60 km from the coast at Gua Sireh as early as 2,300 BC (Bellwood and Datan 1991; Beavitt, Kurui and Thompson 1996). It is possible that it was being grown even further inland at an early date.

The Kelabit-Kerayan highland area is an area of deeply eroded north-south mountain ranges and broad, basin-like valleys through which the rivers meander sluggishly, some of which used to be a lake (Schneeberger 1979:49). The soil of the area is, in pockets, fertile, while in other areas it is swampy and peaty (Eilers and Loi 1982). This, then, is an area which is highly suited to the construction of wet fields. Thus it is certainly possible that rice cultivation is ancient in the Kelabit-Kerayan highland area, and that wet rice was grown there in swampy areas from the time when Austronesians first settled the area. However, archaeological work to search for traces of early rice in the Kelabit-Kerayan highland area has not been carried out as yet, so this remains an open question.

Sellato contends that the Putuk were the original inhabitants of the Kelabit-Kerayan highland area and that they came in during the seventeenth century as dry swidden cultivators, only taking up irrigated wet rice cultivation in the nineteenth century, some time after they reached the highland area (Sellato 1997). In other words, he suggests that wet rice cultivation came late to the

highlands. However, some of his highland informants stated that wet cultivation has been the only form of cultivation practised in Kerayan Darat since time immemorial (Sellato 1997:33). In fact there does not at present seem to be any clear evidence that the Putuk were initially dry swidden cultivators. Neither do we have any evidence as to whether they were the first inhabitants of the area or whether any earlier inhabitants of the highlands practised wet or dry cultivation.

Okushima, looking at the Kayan of the interior, has recently argued both that *rawa* cultivation is the more ancient system of cultivation in parts of the interior which contain swampy areas, and that the Kayan preference for dry fields is anomalous, largely to be attributed to their expansionist, warlike way of life, led by strong leaders who move on to new areas regularly (Okushima 1999). By contrast, although it may be that there was an important migration into the Kelabit-Kerayan highland area in the seventeenth century, as Sellato suggests, the main pattern of migration in the more recent past within the highlands, and very possibly for some centuries or even millennia, has been short-distance moves and strong attachment to specific areas. This is certainly what the Kelabit themselves tell of in relation to the remembered past of known ancestors. The highland area is covered by a network of small settlements, linked closely to each other through frequent intermarriage. Movement of people is mainly movement through marriage, sometimes with associated movements of small numbers of people, and the maintenance of continuity of ties and of cultivation in existing communities. While communities do move, this is not over long distances.

Attachment to specific spots and infrequent, short-distance migration of individuals or small groups, or within the area controlled by a given community, would imply that a form of agriculture which involves some investment of labour, giving a return over a number of years, is worthwhile. Wet fields, even *rawa* cultivation with minimal control of water, involve this kind of investment in a way that dry fields do not. Thus, wet fields made on the Lam Baa system were apparently cultivated for about seven years before being abandoned. The presence of more permanent irrigation ditches (see below) would then make cultivation much easier upon return to the spot again after some years. Until recently, communities appear to have utilized different parts of their territory in rotation.

Sellato suggests that there remains a preference for dry fields in the Kelabit-Kerayan highland area (Sellato 1997), but I would not agree that this is the case in the Kelabit Highlands. Here, wet fields are not seen as a second best option; indeed the current move to make as many wet fields as possible would rather suggest that wet fields are preferred; this relates to the prestigious associations of making marks on the landscape, as already referred to above (see Janowski 1988). I would contend that there are reasons for making

both wet and dry fields, and that it is not possible to discern a deeply-rooted preference for one or the other.

In the Kelabit Highlands, at any rate, both wet and dry cultivation would seem to have had their place for a very long time, possibly for many centuries or even millennia. The choice of which technique to use is dictated largely by the environment: where there is wet swampy ground, wet fields are made, while dry fields are made on sloping ground. However, given the choice, it is arguable that Kelabit households, nowadays, prefer to make both wet and dry fields, since there are advantages associated with each.

Wet fields and dry fields: driving factors

Nowadays there is, as outlined above, a strong impetus to make wet rice fields in the Kelabit Highlands. All hearth-groups, even in communities which cannot export rice, want to have at least one good wet rice field. Why did people become so interested in making wet fields after the Second World War? Although there was an explosion of population in the Bario area from the mid-1960s, this is not the main reason for the increase in wet rice cultivation, since people did not move to Bario because they were having problems growing enough to eat in other communities but specifically to grow wet rice and to be in Bario. The intensification of production which was involved in the making of permanent wet fields was not forced upon people by circumstances but was something they chose freely. There is no evidence that inhabitants of other longhouses who moved to Bario, or those who remained where they were and made wet rice fields there, were doing so because they were under any pressure, unable to produce enough to eat with the methods they were using before. The decision to make permanent wet fields was a free choice based upon other factors.

The possibility of selling rice to the coast is an important factor explaining why people began making more wet fields in Bario. However, it does not explain why people in communities like Pa' Dalih, who are too far away to be able to export rice via Bario, also expanded their wet rice cultivation. The current interest in making wet rice fields needs to be understood in the light of what I have said above about the special nature of decisions relating to rice cultivation. One of the consequences of this is the fact that the very possession of wet rice fields is prestigious. One reason for this is simply that they are used for growing rice; making large dry fields in the past was also said to bring prestige. It is also because, since the making of permanent wet fields involves moving earth, they are marks on the landscape parallel to those made in the past at *irau ate*, death feasts. This, I would suggest, has been and remains an important factor causing people to wish to make permanent wet fields since

the Second World War in the Kelabit Highlands, as mentioned above, and possibly well before that in the Kerayan area. This would not have applied to the shifting wet fields made in Lam Baa in the past, which were not permanent marks on the landscape. However it would seem that the irrigation ditches which fed them, and which were re-used on a cyclical basis, were permanent (Harrisson 1960b:44). Until the 1950s, when the Kelabit became Christian and gave up their death feasts, marks on the landscape, including the erection of megaliths and the making of irrigation ditches, were made at *irau ate*, feasts held at the death of prominent individuals, to mark that person's memory. They brought prestige to the heirs of the individual being commemorated, the hosts of the *irau*, who, through holding it and providing for the guests, were held responsible for the landscape-marking feat associated with it.

Thus, the very possession of permanent wet rice fields is prestigious. For people in Bario, the money which they generate through the sale of the varieties prized in town and grown in the wet fields is also used to generate prestige. There is keen competition for status in Bario at the moment, fuelled by the sale of rice. Money earned from selling rice is used mainly to pay for expensive naming feasts, which generate prestige, as well as to buy ostentatious goods including old beads (*ba'o*) and shop-bought items. Some is spent on children's education – although the state covers the cost of most of this – since success in education is prestigious.

The more permanent wet fields made nowadays are said by the Kelabit to be more productive in terms of labour input, once they are established (this is supported by data on some other Borneo groups – Reed Wadley, personal communication). The Kelabit of Pa' Dalih say that the (eventual) higher productivity is an important reason why they want to establish wet rice fields. I must say that my data from Pa' Dalih suggest that in fact the amount of work invested in wet and dry fields does not seem to vary much at the moment in terms of the relationship between hours invested and amount of rice harvested; there was a very great variation in the number of days invested per basket harvested for both wet and dry fields, but the range was similar for the two types of cultivation and the average was not very different, at 2.67 days per basket for wet fields and 3.05 days per basket for dry fields (see table). However, it is difficult to fully factor in the making and maintenance of wet rice fields, and this is highly significant in terms of labour input. Once the wet fields in Pa' Dalih are well-established, it may well be true that they will be more labour-efficient, as many informants told us would be the case (more in a spirit of hope than anything else since none of the fields in Pa' Dalih were more than 20 years old in the late 1980s and most were much younger). It is not possible to retrieve the efficiency of the old-style wet fields, which involved very different kinds of labour investment in terms of making and maintenance. It is also difficult to factor in the fact that a swidden field pro-

Table 1. Reported return to labour for wet and dry rice fields for 10 hearth-groups in Pa' Dalih (A-J), 1987-1988[3]

Wet fields			
Hearth-group	Number of days work invested	Number of baskets harvested	Days invested per basket
A	52 days	4.5	11.5
B	190.5	96	2
C – field i)	30	60	0.5
C – field ii)	238	203	1.2
E	66	25	2.6
F	270	116	2.3
H	107	36	3
I	103.5	200 acc to hearth-group members[4]	0.5
J – field i)	130	104	1.3
J – field ii)	32	18	1.8

Dry fields			
Hearth-group	Number of days work invested	Number of baskets harvested	Days invested per basket
D	73	30	2.4
E	43.5	20	2.2
F – field i)	6.5	1	6.5
F – field ii)	3.75	1	3.8
G	115	93	1.2
H – field i)	20.5	6	3.4
H – field ii)	15.5	5	3.1
J	32	18	1.8

[3] The baskets used are standard in size and so the figures are comparable from this point of view. The amount harvested is likely to be quite reliable as hearth-group members have good memory of what they have harvested at least for a few months after the harvest. The reliability of the number of days of labour reported as invested, however, is not so good – both because people's memory is not always reliable and varies from person to person, because certain kinds of labour are remembered more than others and because the intensity of labour invested varies from person to person and from day to day.

[4] Though members of other hearth-groups in the same longhouse contended that this hearth-group harvested less than half of this.

duces not only rice but many other crops, into whose cultivation little extra labour is invested.

Permanent wet fields anchor people to one place, and this is, nowadays, something which has become quite desirable. Being in one place means that government services are more accessible. This is not only true in Bario but elsewhere too; there is a primary school and a clinic in Pa' Dalih which serve the four communities (*bawang*) in the south of the highlands, and the flying doctor visits by helicopter once a month. Being in one place also means a more permanent dwelling, and this is something both possible – because of the availability of more permanent materials such as planks made with chainsaws, glass for windows and corrugated metal for roofs from town – and desirable. More permanent dwellings are prestigious, although they are not necessarily regarded as more comfortable in all respects.

However, despite the emphasis on making new wet fields, it is recognized that there is a major advantage to dry fields. While wet fields are used almost exclusively for growing rice (some taro is grown at the margins and water convolvolus is planted on the bunds), dry fields are used for a variety of crops including fruit, vegetables, root crops and other grains. While rice is the fundamental and essential part of a meal, many other foods are eaten as side dishes with rice, and many snacks are also eaten. In Bario, people have always made small gardens, called *ira*, on available slopes, which are used for planting crops other than rice; because they have always been by necessity small, since there is little land suitable for dry fields, they are not used for rice as well.

While there is now a premium on wet fields in the Kelabit Highlands, which explains their growing importance, this does not seem to have been the case in the past, when wet fields appear to have been made because they were the most obvious way of cultivating rice in swampy areas, particularly where there was insufficient sloping dry land of good quality for making dry fields. Where a community had land which was more appropriate for dry cultivation, they made dry fields; where they had land which was suited to wet cultivation, they made wet fields. Where they made only wet fields for rice, they also made *ira* gardens for crops other than rice; where they made dry fields for rice, they planted other crops with the rice and *ira* were not necessary. It does not seem that wet fields of the old style made in Lam Baa, which were not not permanent, were preferred to dry; if anything, dry fields had the advantage of it being possible to plant other crops too.

The wet fields of the Kelabit-Kerayan highland area struck visitors who visited before the Second World War because they seemed so odd and wonderful in this remote, interior setting, surrounded by areas which were cultivated by dry shifting cultivation. Although it has been suggested by some who visited in the first half of the twentieth century that the people of Lam Baa obtained particularly good rice harvests from their old-style wet fields

(Harrisson 1959:66-7; Banks 1937:425), the general good harvests obtained in the Kelabit Highlands are also remarked upon (Banks 1937:496), and it is not clear that the harvests were any better in Lam Baa's wet fields than in the dry fields elsewhere, at least as regards return to labour. It would seem likely that wet fields came to be particularly desirable when they became more permanent, because they became more prestigious and produced rice which could be sold in town (which itself generated prestige). Only after the Second World War did this happen in the Kelabit Highlands. However, more permanent wet fields may already have existed in the Kerayan area. It is therefore possible that in the Kerayan there may have been a preference for wet rice fields which goes back much further, based on the prestige associated with more permanent fields.

Bario: rice and little else

Along with and partly due to the increasing importance of wet rice cultivation in the Kelabit Highlands, settlement in the Kelabit Highlands is becoming more and more static and sedentary. Longhouses are not now moved far when they are rebuilt; and they are not rebuilt often because more permanent materials are being used. Wet rice land is acting as one of the anchors keeping people in one place. This is true both in Bario and in settlements outside Bario.

Since the 1960s the movement of people into Bario has been depopulating longhouses in the southern part of the Highlands like Pa' Dalih. Despite the difficulty of getting good wet rice land, people are continuing to concentrate in Bario, because it is now the cultural and prestige centre of the Highlands, as it was not before the 1960s. With the growing significance of Kelabit (as opposed to local) identity since the Second World War, Bario, as the centre of this identity, has acquired a special status. In Bario it is possible to build up prestige and a 'name' in a way which is difficult elsewhere in the Highlands. Not only is it possible to grow wet rice for export, to earn money and to build prestige there; it is also connected directly to the outside world by air. The outside world has come to have a very great significance for the Kelabit since the 1960s. This is mediated through the fact that so many Kelabit are now living outside the Highlands, mainly in Miri, to which Bario is directly connected by air. A major expression of their increased connection with the outside world is the Kelabit conversion to Christianity from the 1940s to the 1970s, and by air they are linked to the centre of their church, the Sidang Injil Borneo (SIB), in Lawas.

With the move to Bario, the Kelabit are becoming more focused on rice agriculture than ever before. In Bario, it is difficult to grow much of anything besides rice, because most of the land is swampy. In the past, the little

non-swampy land was enough for the small population to grow adequate other crops. Now, however, with the increased population, this is not the case. There is very restricted access to the forest for wild foods and handicraft materials. Money is increasingly being used, therefore, not only to build prestige but also to buy food to eat with rice at the rice meal – tinned and frozen foods from town, wild meat brought in from other settlements. In the past – and in a community like Pa' Dalih even nowadays – a good deal of time was spent on gathering and hunting and on collecting cultivated vegetables and fruit (even though little care is given to crops other than rice while they are growing) and these foods are traditionally very important to the Kelabit diet. Although little emphasis was or is placed on this aspect of life, since it is rice which is emphasized explicitly, the Kelabit were not in the past, and in Pa' Dalih are still not, just rice growers. However, in Bario nowadays they are becoming so.

There are indications that there is an unease about this absolute reliance on rice and the lack of other cultivars and of access to the forest. The people of Pa' Dalih certainly regret that they are not able to export rice, as are the people of Bario; but they are emphatic about the advantages of their more mixed cultivation, which yields cultivated vegetables to eat with rice as well as a multitude of snack foods made from maize and cassava, as well as fruit. The people of Bario, they say, *na'am nok penguman*, 'have nothing to eat [with their rice]'. In other words, tinned and packeted foods bought from town, while demonstrating the possession of cash, are not really seen as the proper things to eat with rice. There is a sense that the people of Pa' Dalih have something very valuable in their ability to make dry as well as wet rice fields. This is an important reason why those people who remain there at the beginning of the twenty-first century have not left Pa' Dalih.

Conclusion

We do not know when rice was introduced to the Kelabit-Kerayan highland area. In the Kelabit Highlands, at any rate, it is believed that their ancestors have always lived in the area and that they have always cultivated rice. It is possible that rice was introduced a very long time ago, as soon as Austronesians had managed to develop varieties which were suited to tropical latitudes, and that the Apo Duat peoples of the highland area, including the Kelabit, have been cultivating rice for millennia. However it is also possible that it was introduced quite recently and that Kelabit memory is selective, not wishing to remember a time when this focal crop and food, so defining of their identity and even their humanity, was not present. The Kelabit do rely on many other crops, including other starchy crops, and on plants and animals from the forest

for their food. It is very possible that starchy crops other than rice, particularly taro, may have had a central role in the past, even the recent past.

The Kelabit make both wet and dry rice fields nowadays, and it would appear that this was also true at the beginning of the twentieth century. There are reasons why they might have favoured both types of field in the recent past, before the Second World War. Wet fields of the *rawa* type, made without much complex water control or earth-moving, are easier to make in the swampy areas which are common in the highland area without many iron tools, of which there were few in the Kelabit Highlands until recently. On the other hand, dry fields can be used for crops other than rice. The choice of which type of field to make, at least in the Kelabit Highlands, appears to have been dictated by the ecology of different areas. In some areas, like Lam Baa (Bario), only wet rice was grown; in other areas both wet and dry; and in some areas, which had no swampy land, only dry.

Wet fields with any degree of permanence are prestigious possessions, and this is a major impetus for making them. The intensification associated with these fields did not take place because of pressure of population on existing resources, of which there is no evidence, but through choice, at least partly based on this prestige. There are indications that intensification may have taken place earlier in the Kerayan highland area across the border with Indonesia, than in the Kelabit Highlands, where a form of wet cultivation which involved the making of permanent drains but not permanent fields was practised until after the Second World War. After the Second World War, when the Kelabit obtained more iron tools, people began to make wet rice fields all over the Kelabit Highlands, not only in swampy areas but in other floodable areas too. In Bario, a swampy area where temporary *rawa* wet fields have almost certainly always been the normal mode of cultivation, there was an explosion in the making of permanent wet rice fields at this time. A huge influx of people from other communities into the Bario area took place, which started with the government's move of some border communities to Bario at the time of the Confrontation in the mid-1960s but continued after this. The emphasis on making wet fields in Bario was prompted by the prestige of their possession, the desire to retain a hold on land in a context where labour investment creates de facto land ownership, and by the fact that it became possible to sell the varieties of rice grown in wet fields to town by air after the introduction of a regular air service from Bario to Marudi (later Miri as well) from 1962. The cash which this generated fuelled an intense status competition. Outside of Bario, in a community like Pa' Dalih, wet fields were made because of their prestige and because of the hope that it may, in the future, become possible to export rice.

Nowadays the Kelabit, particularly in Bario, have become even more focused on rice growing than before. While in the past rice was most certainly

the focal crop and food, there was a heavy reliance, in practice, on other crops as well as on wild foods, coupled with a dependence on not only wet but also dry cultivation of rice. This continues in settlements like Pa' Dalih, and is, indeed, highly valued. Nowadays, in Bario, little is grown besides rice and rice has become, via its sale for cash used to buy other foods, the means of obtaining a large – and growing – proportion of everything which is eaten. It is also the means of funding the big naming feasts which are the vehicle for competition in building status. Rice, then, has in Bario not only retained but even increased its centrality to Kelabit life, representing the basic staff of life both through its consumption and its sale, as well as continuing to feed directly into the generation and retention of social status. There is, however, a price to pay for this: a higher level of social tension and competition and, in Kelabit eyes – and it is probable that they are right in this judgement, in nutritional terms – an impoverished diet.

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J.F. LE COQ, G. TRÉBUIL and M. DUFUMIER

History of rice production in the Mekong Delta

Introduction

During the years following the launch in 1989 of its economic liberalization policy, known as 'Doi Moi' (Renovation Policy), Vietnam experienced a dramatic growth in rice production of 5.4% per year between 1990 and 2000, one of the highest growth rates observed in the world for this period. This dramatic growth of rice production allowed the country to reach food self-sufficiency at the national level and to become a major rice exporter with more than 2 millions tons exported in the early nineties. With almost 3.5 millions tons of rice exported in 2000, Vietnam is the second rice-exporting country with a share of some 15% of the world market. At the same time, Vietnam experienced a rapid increase of its population living standard and rapid reduction of poverty. At first glance, Vietnam could thus be considered as a successful example of a liberalization policy. Such excellent macroeconomic results are often described as the consequence of recent economic reforms (Pingali and Vo Tong Xuan 1992; Schulders 1997). Although these reforms were important, we argue that such rapid and strong results cannot be fully explained by the recent implementation of a new policy. On the basis of a historical approach aiming at a full understanding of the profound effects of this relatively recent agricultural policy, we separate the role of the post-1989 liberalization policy from other pre-existing agricultural conditions to explain the rice production development process in Vietnam. Since the evolution of rice production is closely linked to the development of the 'Green Revolution', we will explain the conditions of its impact in Vietnam.

This article focuses on the Mekong Delta, the main rice bowl of the country, which produced 51% of the domestic production in 1995 (Figure 1). This area displays the highest per capita paddy production, at around 0.8 ton per year, and provides some 80% of the total amount of rice exported by Vietnam in 1995 (Lebailly et al. 2000). By achieving the highest growth rate in paddy production from 1985 to 1995, the Mekong Delta contributed significantly to the recent impressive results in rice production and export at the national level.